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Fiscal rules, budget deficits and budget projections

Simon Luechinger · Christoph A. Schaltegger

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Abstract Fiscal rules are mentioned as instruments to commit political actors on long-term fiscal sustainability. However, fiscal rules may have stronger effects on projected than on realized fiscal outcomes because of window-dressing measures or because they alter the bargaining situation in the budget process. In our analysis for Swiss cantons, fiscal rules significantly lower the probability of projected and realized deficits with the former effect being twice as large. Projections are generally over-pessimistic but fiscal rules increase the probability of accurate projections. Thus, fiscal rules seem to substitute for finance ministers' over-pessimistic projections intended to reign in fellow ministers and legislatures (100 words).

Keywords Deficit projections · Deficits · Fiscal rules · Budget process

JEL Classification D72 · H72 · H79

1 Introduction

Fiscal rules have become an important institutional requirement for many countries in balancing their budgets. While until the early 1990s, only few countries used fiscal

S. Luechinger · C.A. Schaltegger (✉)
Department of Economics, University of Lucerne, Frohburgstrasse 3, P.O. Box 4466, 6002 Lucerne, Switzerland
e-mail: christoph.schaltegger@unilu.ch

S. Luechinger
e-mail: simon.luechinger@unilu.ch

S. Luechinger
KOF Swiss Economic Institute, ETH Zurich, Zurich, Switzerland

C.A. Schaltegger
University of St. Gallen, St. Gallen, Switzerland

rules in their budget procedures, a comprehensive survey by the IMF (2009) counts more than 80 countries having enacted balanced-budget requirements in some way on the federal or sub-federal level. Most recently, on 2 March 2012, most members of the Eurozone agreed on a European Fiscal Compact. The compact requires treaty-countries to balance their budgets on a maximum annual structural deficit of 0.5 % of GDP—1 % structural deficit in case of debt levels significantly below 60 % of GDP. Very much the same applies for the nation-level. Germany has approved the *Schuldenbremse* on all levels of government as an institutional provision for sustainable public finances (Feld 2010). The German *Schuldenbremse* has been inspired much by the Swiss experience on this specific fiscal rule, which dates back to 2003 (Danninger 2002). In France and other countries, fiscal rules are now proposed by the government to signal their commitment for efforts in consolidating public finances (IMF Article IV consultations, 2011).

A predominant explanation for the need of balanced budget requirements focuses on the common pool characteristics of the public budget, which tends to be overused by special interest groups that try to target public spending on specific claims while spreading the costs by general taxes over the whole taxpaying population (Weingast et al. 1981; Velasco 2000; van der Ploeg 2010; various articles in Poterba and von Hagen 1999). Overall, there is ample evidence on the effectiveness of fiscal rules in restraining budget deficits and government indebtedness for many countries (Debrun et al. 2009). Guichard et al. (2007) also provide empirical evidence for OECD countries that fiscal rules support fiscal adjustments, especially in cases of large consolidations.

However, fiscal rules have also been subject to criticism due to their incentives for "creative accounting" and "window-dressing" measures including overly optimistic fiscal projections. For example, von Hagen (2010) argues that budget institutions like fiscal rules are an important determinant of budgeting errors. Intuitively, fiscal rules may have two different effects on the quality of budget forecasts: On the one hand, fiscal rules could create incentives to be overly optimistic in budget projections in order to postpone politically disputed budget cuts or tax increases. On the other hand, without fiscal rules, finance ministers may strategically use over-pessimistic budget forecasts to rein in the spending ministers and the legislatures. Fiscal rules lower these incentives. In both cases, fiscal rules reduce the probability of projected budget deficits by more than they reduce the probability of realized ones. However, while in the former case budget projections become less reliable, they become more accurate in the latter case.

Our empirical analysis for Swiss cantons over the 1984 to 2005 period finds evidence consistent with these expectations. Fiscal rules reduce the probability of projecting and realizing a budget deficit. However, the former effect is roughly twice as large as the latter. Since budget projections in Swiss cantons are on average overly pessimistic, we take this as evidence that fiscal rules substitute strategic projections in budget negotiations between the finance minister and fellow cabinet members or legislatures. We find similar results with different estimation techniques, estimators of variance, different codings of the fiscal rule variable, additional institutional and political variables as well as when excluding individual cantons.

Our paper contributes to two strands of the literature. First, it contributes to the literature on the effects of fiscal rules on fiscal outcomes (Poterba 1994; Rueben

1995; Bohn and Inman 1996; Feld and Kirchgässner 2001; Schaltegger 2002; Debrun et al. 2008) as well as on window-dressing measures (von Hagen 1991; Milesi-Ferretti 2003; Koen and van den Noord 2005; Von Hagen and Wolff 2006; Buti et al. 2007). Second, the paper contributes to the literature on forecasting errors in fiscal projections (Heinemann 2006; Wallack 2007; Boylan 2008; Goeminne et al. 2008; Bischoff and Gohout 2010; von Hagen 2010; Frankel 2011; Chatagny and Soguel 2012).

The remainder of the paper is organized as follows. In Sect. 2, we discuss potential effects of fiscal rules on budget deficits, both projected and realized. Section 3 presents the empirical strategy and the data, Sect. 4 the results. Concluding remarks are provided in Sect. 5.

2 Background

Fiscal rules aim at constraining governments' ability to run deficits and accumulate debt. However, fiscal rules not only create incentives for fiscal adjustments, they also create incentives to avoid the constraints imposed by these rules through various forms of window-dressing measures. Further, the introduction of fiscal rules can also alter the bargaining situation in the budget process. In particular, fiscal rules may reduce the incentives of finance ministers to strategically understate projections of fiscal outcomes in negotiations with spending ministers or the legislatures.

Economists have long recognized the incentives created by fiscal rules for the use of creative accounting and strategic use of fiscal projections. Milesi-Ferretti (2003) studies the optimal design and effectiveness of fiscal rules in the presence of creative accounting. He finds that the scope for creative accounting makes tighter fiscal rules desirable. Several empirical studies for the US states and European countries document evidence of fiscal gimmickry induced by fiscal rules. In an analysis of fiscal performance across the US states, von Hagen (1991) finds that debt ceilings lead governments to substitute nonrestricted debt instruments for restricted ones. Von Hagen and Wolff (2006) and Buti et al. (2007) show that the Stability and Growth Pact in the European Union increased the propensity of governments to shift budget deficits to off-budget deficits in form of stock-flow adjustments. In the same vein, Koen and van den Noord (2005) find publicly known instances of fiscal gimmickry in the European Union to become more likely with binding fiscal rules.

With such window-dressing measures, governments meet the letter but not the spirit of fiscal rules. Nevertheless, the fiscal variables targeted by the rules do improve. This need not be the case if governments strategically use fiscal projections in the budgetary process. In particular, governments may use overly optimistic projections in order to buy time and meet rules requiring governments to submit or legislatures to pass a balanced budget. Indeed, Bohn and Inman (1996) find that in the retrospective, end-of-the-year requirements but not prospective, beginning-of-the-year requirements have a positive effect on the surplus of general funds in US states.

Fiscal rules may also alter the bargaining situation between the finance minister and spending ministers or between the government and the legislature in the budget process. Spending ministers and legislatures benefit from specific policies targeted

at their constituencies, but they bear only part of the marginal costs since the costs are financed by taxpayers in general. This common pool characteristic of the budget leads spending ministers and legislatures to overspend. A fragmented government also leads to a dynamic common pool problem with too much spending and too little taxation in the present, and thus accumulation of deficits (Velasco 2000; van der Ploeg 2010). Besides the prime ministers, only finance ministers without portfolio and responsible for the full budget internalize the full costs (von Hagen and Harden 1995). Further, prudence and caution is important for finance ministers' reputation (van der Ploeg 2010). Finance ministers may thus strategically use fiscal projections to rein in spending ministers and legislatures. In particular, finance ministers have an incentive to produce overly pessimistic forecasts so as to discourage excessive spending bids by cabinet members and legislatures. This, however, can lead to suspicion among fellow cabinet members and legislatures regarding finance ministers' deficit projections. Indeed, there is often widespread suspicion among cantonal legislatures that projections are systematically erring on the side of pessimism (see Schaltegger and Weder 2010 for a recent example for the canton of Zurich). Anticipated projection biases can therefore become part of the equilibrium of negotiations (von Hagen 2010).

Fiscal rules that require the government to submit and the legislature to pass a balanced budget substantially alter the bargaining situation between the finance ministers and the cabinet as well as between the finance minister and the legislature. On the one hand, it becomes more costly for finance ministers to submit a budget deficit for strategic reasons. On the other hand, binding fiscal rules also reduce the need for strategic behavior in the budget process. Finance ministers can invoke the fiscal rule to rein in spending ministers and legislatures. In this sense, fiscal rules serve as a substitute for strategic projections.[1]

To summarize, we expect that fiscal rules have the intended effect on the fiscal aggregate targeted by the rules. However, the reasoning above suggests that we should expect different effects on projected than on realized deficits. Specifically, we expect a stronger effect on projected than on realized deficits. The difference can reflect time-buying and window-dressing measures or reduced incentives of finance ministers to strategically submit overly pessimistic budgets.

3 Empirical strategy and data

We test the theoretical expectations with data for Swiss cantons in the years 1984 to 2005. Swiss cantons provide an ideal testing ground for three reasons. First, there was a staggered introduction of fiscal rules in half of the cantons until 2005. We can, thus, identify the effect of fiscal rules on our outcomes of interest by controlling for all time-invariant canton-specific as well as nationwide time-specific confounders. Second, Swiss cantons have a high degree of fiscal autonomy. In Switzerland, cantons

[1] According to von Hagen (2010) stringent fiscal rules may increase incentives for using projections strategically. This is the case if negotiations over additional budget cuts are particularly costly and if such renegotiations become less avoidable with more stringent fiscal rules.

are directly responsible for around 40 % of all public revenues and expenditures. Third, in spite of institutional variation and fiscal autonomy, Swiss cantons share a broadly common constitutional, political, and cultural environment. Thus, there is less heterogeneity across cantons than across countries, making spurious correlations caused by omitted variables less likely.

Our two main dependent variables are binary variables for whether or not a deficit has been projected or realized. This is arguably the margin most directly affected by fiscal rules. Fiscal rules are not binding in case of a budget surplus, which is the rule in our sample. Hence, fiscal rules do not affect the size of a budget surplus. Some of the consequences stipulated by fiscal rules may increase with the size of the deficit. This is, for example, the case if fiscal rules require deficits to be repaid with funds included in next year's budget. Other consequences, such as the postponement of tax cuts, are independent of the size of the deficit. Further, the political costs for violating fiscal rules are also likely to depend more on the occurrence of a deficit, than on its size. The same approach has been used previously by Bohn and Inman (1996).

Harmonized data on deficits and deficit projections are obtained by the conference of cantonal finance ministers (Konferenz der kantonalen Finanzdirektorinnen und Finanzdirektoren, FDK for short); the data are available since 1984.[2] In Swiss cantons, the government prepares the budget proposal for the parliament as a so called *Voranschlag*. Based on this input, the parliament decides on budget projections, the so called *Budget*. Our variable on deficit projections refers to budgets passed by the legislature, i.e., the *Budget*. Both, proposal and projections are subject to fiscal rules, if existing.

Our explanatory variable of interest is the fiscal rule variable. While at the federal level, the *Schuldenbremse* exists since 2003, the situation at the cantonal level is much more diverse. In St. Gallen (SG), a fiscal rule was introduced in 1929 already. In Fribourg (FR), the fiscal rule dates back to 1960. More recently, Solothurn (SO) (1986), Grisons (GR) (1988), and Appenzell a. Rh. (AR) (1996) followed the early examples. Jura (JU) (2001), Lucerne (LU) (2001), Zurich (ZH) (2001), Berne (BE) (2002), Schwyz (SZ) (2004), Aargau (AG) (2005), Neuchatel (NE) (2005), and Valais (VS) (2005) have introduced their fiscal rules on the basis of the *Schuldenbremse* at the federal level.

A detailed description of the legal provisions for the cantonal fiscal rules can be found in Feld and Kirchgässner (2008) and Feld et al. (2011a, 2011b).[3] The legal requirements of these rules differ largely along several dimensions: budget coverage of the rule, escape clauses, sanction mechanisms or constitutional implementation (see Table 4 in the Appendix). According to Feld and Kirchgässner (2008) and Feld et al. (2011a, 2011b), the stringency of fiscal rules in Swiss cantons can be distinguished into three groups. St. Gallen (SG) and Fribourg (FR) are most restrictive, especially because the rules force the government to increase taxes or to compensate budget deficits in the following budgets as a sanction in case the requirements are not met. The second most stringent rules apply for Aargau (AG), Berne (BE), Lucerne (LU),

[2] Data since 1999 are online available under http://www.fdk-cdf.ch/index/finanzdaten.htm; for earlier years we obtained copies of the data tables from Christian Meyer, finance administration of the canton of Zurich.

[3] An early version of a fiscal rule index for Swiss cantons can be found in Schaltegger (2002).

Neuchatel (NE), Solothurn (SO), and Valais (VS). In most cases, fiscal rules do not entail or have only lose automatic sanctions which make the enforcement of the rule more difficult. The third group covers the cantons of Appenzell a. Rh (AR), Grisons (GR), Jura (JU), Schwyz (SZ), and Zurich (ZH). Their rules have several escape clauses, define a narrow budget coverage with loopholes or do not secure the rule constitutionally which makes effective enforcement of the rules even more unlikely.

Following this categorization, Feld and Kirchgässner (2008) build a fiscal rule index, which gives the value of 3 to the first group of cantons with most stringent rules, 2 to the second group of cantons with moderately stringent rules, 1 to the group with the least stringent fiscal rules and 0 for all others. Since there is always some arbitrariness in the construction of a stringency-index, we also use a dummy variable if a fiscal rule applies as an alternative to the index in our empirical analysis.

It is important to note, that budget rules for Swiss cantons do not relate to structural deficits. In the cantonal laws, there is not a reference to an output gap, which should be taken into account. In contrast to fiscal rules at the national level, it is currently impossible to implement cantonal rules relating to the structural deficit since no data on the structural budget of cantons exist. However, some cantonal fiscal rules have implemented escape clauses in the case of a severe recession. Thus, fiscal rules on the cantonal level apply to the nominal budget but in some cases leave space for times of severe economic distress.

In our baseline regressions, we control for debt as a share of cantonal income and voters' fiscal preferences. The variable for voters' preferences is an updated and time-varying version of similar variables constructed by Dafflon and Pujol (2001), Pujol and Weber (2003), and Funk and Gathmann (2011). The variable captures voters' fiscal preferences as revealed in federal ballots. This variable has two notable advantages. First, federal ballots on fiscal issues are frequent. Thus, using cantonal approval rates on these ballots yields a very direct realtime measure of fiscal preferences. Second, the ballots provide a simultaneous decision by voters from all cantons on the exact same issue. The measure is thus directly comparable across cantons. Based on the approval rates, we build a time-variant continuous variable of fiscal conservatism of cantonal voters. Following Dafflon and Pujol (2001), we define fiscal conservatism as a preference for a balanced budget. For a particular ballot, cantons receive higher values the higher (lower) the acceptance rate of ballots leading to less (more) expenditures is. Similarly, cantons receive higher values the higher (lower) the acceptance rate of ballots leading to more (less) revenues is.[4]

[4]The preference measure is constructed in four steps. First, we select the ballots at the federal level with strong and unambiguous fiscal consequences. Second, we code the type of the fiscal consequences, i.e., whether the ballot results in expenditure increases or decreases, tax increases or decreases, or fiscal adjustments. On this basis, we determine whether an individual in favor of a balanced budget would reject or accept the proposition. Third, the preference index is constructed as the deviation of the cantonal approval rate from the national approval rate. Following Dafflon and Pujol (2001) and Pujol and Weber (2003), the votes are normalized so as to give the Swiss mean an approval rate of 50 percent. Finally, the preference measure is aggregated over individual ballots to the level of cantons and years. For the years up to 1998, we use the selection and coding of ballots as provided by Dafflon and Pujol (2001) and Pujol and Weber (2003). For later years, we selected and coded the ballots ourselves by examining the official documents on the ballots and following the coding rule proposed by Dafflon and Pujol (2001) and Pujol and Weber (2003). From the 75 ballots held between 1999 and 2005, we identified 24 that have strong

The sociodemographic and the income situation of the cantons are taken into account by growth of cantonal income per capita, unemployment growth, the share of population below the age of 20 and above the age of 64 as well as a variable capturing the share of the German-speaking population. Data on cantonal income is only available until 2005, restricting our sample period to the years 1984–2005. Further, many cantons switched from a system in which taxes are based on previous year's income (praenumerando system) to a system in which taxes are based on current year's income (postnumerando system). In a postnumerando system, tax revenue forecasting takes place under greater uncertainty. Therefore, we include a dummy variable for cantons and years with a postnumerando tax system in all our regressions.

In robustness analyses, we include a rich set of further institutional and political variables. We include variables for institutional provisions like mandatory fiscal referenda to control the budget process, the signature requirement to launch a voter initiative, and the degree of fiscal decentralization between the cantons and their communes. Further, we control for cabinet size and the size of the parliament to proxy the extent of the common pool problem with the cantonal public budget. As an additional measure of the ideological position of cantonal politics, we use the share of left-wing legislatures.

4 Results

Table 2 presents the basic results for the effect of fiscal rules on the probability of projected and realized deficits. Fiscal rules lower the probability of a projected deficit by around 28 %, the probability of a realized deficit by around 15 %. Thus, the effect on projected deficits is nearly twice as large as the effect on realized deficits. Further, the difference is not only economically large, it is also statistically significant (p-value: 0.005).[5] Regressions with forecasted and realized surplus as a share of cantonal income yield broadly similar results with respect to sign and relative size of coefficients, but not with respect to statistical significance. The effect of fiscal rules on forecasted surplus is positive (coef.: 0.0010; p-value: 0.232) and 37 % larger than the effect on realized surplus (coef.: 0.0008; p-value: 0.752).[6] However, as we discussed in Sect. 3, we do not think that the continuous surplus variable is the appropriate dependent variable. Fiscal rules relate to the nominal deficit, not the structural deficit. Thus, they are not binding in the case of a surplus, which is the rule in our sample. Second, many consequences such as the postponement of tax cuts and political costs depend on the occurrence of a deficit rather than on its size. Therefore, the occurrence of a deficit versus a surplus is the margin most directly affected by fiscal rules.

Among the control variables, only demographics matter: Population growth for projected and realized deficits and age composition of the population for realized deficits.

and unambiguous fiscal consequences. The list with the selection and coding of ballots is available upon request.

[5]The statistical difference between the coefficients for fiscal rules in columns I and II of Table 2 is estimated using seemingly unrelated regressions. Complete results available upon request from the authors.

[6]Complete results available upon request from the authors.

Table 1 Summary statistics

Variable	Mean	Std. Dev.	Min	Max
Deficit forecasted	0.75	0.43	0.00	1.00
Deficit realized	0.39	0.49	0.00	1.00
Sign of budget balance correctly forecasted	0.59	0.49	0.00	1.00
Fiscal rule index	0.42	0.91	0.00	3.00
Fiscal rule dummy	0.20	0.40	0.00	1.00
Debt as share of cantonal income	0.15	0.11	0.02	0.88
Voter preferences	49.90	6.46	20.49	72.00
Mandatory fiscal referendum	0.64	0.48	0.00	1.00
Signature requirement initiative, relative	0.01	0.01	0.00	0.04
Fiscal/revenue decentralization	0.32	0.10	−0.01	0.49
Cabinet size	6.28	1.12	5.00	9.00
Parliament size	115.32	47.00	46.00	200.00
Share of left-wingers in parliament	0.23	0.13	0.00	0.53
Growth income per capita	0.03	0.05	−0.26	0.42
Growth unemployment	0.17	0.59	−1.00	3.50
Growth population	0.01	0.01	−0.01	0.05
Share of population below age 20	0.24	0.03	0.16	0.32
Share of population above age 64	0.15	0.02	0.10	0.21
Share of German speaking population	0.70	0.35	0.04	0.98
Postnumerando tax system	0.23	0.42	0.00	1.00
$N = 566$				

The negative effect on the probability of realized deficits indicates that fiscal rules have the intended effect and commit political actors on long-term fiscal sustainability. Thus, our result adds to the existing literature showing that fiscal rules are effective. However, we cannot rule out that, at least partly, budget deficits have been shifted to off-budget deficits by fiscal gimmickry.

The differential effects of fiscal rules on projected and realized deficits are consistent with the theoretical expectations discussed in Sect. 2. The effect on projected deficits may be larger than the effect on realized deficits either because governments use over-optimistic projections to buy time and meet rules requiring them to submit a balanced budget or because fiscal rules substitute for the strategic use of over-pessimistic projections in budget negotiations by the finance minister. Since both explanations point in the same direction, it is not possible to differentiate between them. However, as can be seen in Table 1, deficit projections are on average much too pessimistic in Swiss cantons over the sample period. While governments projected a deficit in 75 % of all observed canton-years, only in 39 percent of the canton-years a deficit actually materialized. Further, in column III of Table 3, we analyze the effects of fiscal rules on forecast accuracy. Our dependent variable ("forecast correct") is a dummy variable with value one if the sign of the budget balance, i.e., the sign of revenues minus expenditures, was correctly anticipated and zero otherwise. In our sample, the sign of the budget balance was correctly anticipated in 59 % of the ob-

servations (see Table 1). According to our estimates, the introduction of fiscal rules increases the probability that the occurrence of a deficit or surplus is correctly anticipated by 14 % (p-value: 0.0496). Using the natural log of the absolute forecast error as a dependent variable, we find that fiscal rules reduce the forecast error by 30 % (p-value: 0.048).[7] Thus, despite the results being less statistically significant than the results reported in columns I and II of Table 2, the evidence is consistent with fiscal rules leading to projections which are more accurate on average. Together, we take this as strong evidence that fiscal rules substitute for strategic projections in budget negotiations.

One might be concerned about the endogeneity of the adoption of fiscal rules. In particular, changes in fiscal conditions or political preferences may lead to the adoption of fiscal rules and to smaller deficits. Let us carefully address this issue in the following.

Endogeneity is clearly an important issue in estimating the effect of fiscal rules on the probability of realized deficits (Poterba 1997). However, it is less clear why fiscal conditions or preferences should influence the strategic use of forecasts. Thus, while our OLS results on the effects on realized deficits have to be interpreted with caution, the interpretation of the results on the differential effects on forecasted and realized deficits is less plagued by endogeneity problems.

As pointed out by Poterba (1997), there are essentially two ways to address the issue of endogenous fiscal institutions: Including some measure of voter preferences or using instrumental variables. The previous literature either ignored the issue or followed one of these approaches. Bohn and Inman (1996) and Feld and Kirchgässner (2001) followed the first approach, Rueben (1995) and Debrun et al. (2008) the second. As instruments for fiscal rules they used direct legislation laws (Rueben 1995) and lagged fiscal rules and the commitment form of fiscal governance (Debrun et al. 2008). However, direct legislation laws and the form of fiscal governance influence fiscal outcomes through many channels other than the enactment of fiscal rules (von Hagen and Harden 1995; von Hagen 1998; Matsusaka 2005). (In fact, we include direct legislation laws as an additional control variable in our robustness analyses.) Lagging the explanatory variable does not overcome the problem that permanent changes in preferences simultaneously affect fiscal institutions and fiscal outcomes.

Despite our reservations regarding the validity of the exclusion restrictions, Table 5 in the Appendix reports instrumental variable regressions with signature requirements for popular initiatives and lagged fiscal rules as instruments. All Swiss cantons have direct participation rights, but low signature requirements make it easier to adopt a fiscal rule even with identical fiscal conditions and political preferences. The form of fiscal governance is very similar across cantons and stable over time, thus we cannot use it as an instrumental variable. In addition, Table 5 reports regressions with two additional instrumental variables capturing the share of neighboring cantons that have adopted a fiscal rule. Once neighborhood is defined geographically, once it is defined in terms of religion. In Switzerland, cantonal alliances based on religious

[7] Complete results available upon request from the authors.

Table 2 Baseline regressions

	I Deficit forecasted	II Deficit realized	II Forecast correct
Fiscal rule index	−0.281[a]	−0.153[b]	0.138[b]
	(0.083)	(0.065)	(0.067)
	[0.021]	[0.062]	[0.073]
	{0.001}	{0.019}	{0.036}
Debt as share of cantonal income	−0.272	0.081	0.221
	(0.362)	(0.438)	(0.349)
Voter preferences	0.002	−0.001	−0.002
	(0.003)	(0.004)	(0.004)
Growth income per capita	0.044	−0.180	−0.598
	(0.632)	(0.417)	(0.808)
Growth unemployment	0.012	−0.054	−0.059
	(0.058)	(0.064)	(0.071)
Growth population	−6.911[b]	−8.744[b]	−4.148
	(3.120)	(3.702)	(4.697)
Share of population below age 20	4.359	4.972	3.044
	(3.733)	(3.500)	(3.189)
Share of population above age 64	3.405	6.166[b]	5.206
	(3.642)	(2.602)	(5.417)
Share of German speaking population	−0.001	−0.728	1.617
	(1.318)	(1.873)	(2.180)
Postnumerando tax system	0.091	−0.237	−0.320[c]
	(0.131)	(0.163)	(0.164)
Year effects	Yes	Yes	Yes
Canton effects	Yes	Yes	Yes
Number of observations	566	566	566
Number of clusters	26	26	26
R-squared within	0.254	0.286	0.134

Notes: (1) Fixed effects OLS regressions; (2) standard errors in parentheses are adjusted for clustering at the level of cantons; (3) p-values in brackets are estimated using the wild-cluster bootstrap-t procedure to account for the small number of clusters, p-values in braces account for nonnested two-way clustering at the level of cantons and years;

[a]is significant at the 99 % level

[b]is significant at the 95 % level

[c]is significant at the 90 % level

ties are very important and the antagonism between Catholic and Protestant cantons is an important aspect of Swiss history.

As can be seen from Table 5, the neighborhood variables and the signature requirement for popular initiatives are weak instruments and have counterintuitive signs in the first-stage regressions. Further, the second stage results are very sensitive to the

Table 3 Robustness analyses and extensions

	I		II		III		IV		V	
	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized
Fiscal rule index	−2.180	−1.088[b]			−0.241[a]	−0.107[b]	−0.257[b]	−0.155[b]	−0.218[b]	−0.105[b]
	(1.416)	(0.474)			(0.082)	(0.042)	(0.096)	(0.069)	(0.101)	(0.050)
Fiscal rule dummy			−0.337[b]	−0.166[c]						
			(0.129)	(0.096)						
Debt as share of cantonal income	−1.751	−2.156	−0.289	0.081	−0.271	0.133	−0.321	0.053	−0.326	0.074
	(5.780)	(5.430)	(0.376)	(0.446)	(0.327)	(0.435)	(0.358)	(0.397)	(0.338)	(0.413)
Voter preferences	0.007	−0.006	0.002	−0.002	0.003	−0.001	0.003	−0.001	0.003	−0.001
	(0.028)	(0.035)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)
Growth income per capita	−0.365	−0.951	0.046	−0.178	0.007	−0.163	0.034	−0.157	−0.023	−0.179
	(4.580)	(3.132)	(0.635)	(0.418)	(0.619)	(0.439)	(0.620)	(0.414)	(0.609)	(0.433)
Growth unemployment	0.199	−0.299	0.008	−0.055	0.010	−0.060	0.027	−0.038	0.026	−0.048
	(0.793)	(0.537)	(0.058)	(0.064)	(0.061)	(0.068)	(0.055)	(0.062)	(0.055)	(0.063)
Growth population	−69.501[b]	−70.396[b]	−7.163[b]	−8.889[b]	−5.779[c]	−7.392[c]	−7.403[b]	−9.452[b]	−6.078[b]	−7.570[c]
	(28.668)	(34.748)	(3.106)	(3.701)	(3.051)	(4.093)	(2.948)	(3.790)	(2.952)	(3.935)
Share of population below age 20	30.949	35.347	4.506	5.022	3.835	3.702	2.985	3.404	3.052	3.069
	(35.900)	(34.980)	(3.757)	(3.556)	(3.021)	(3.423)	(3.630)	(3.522)	(3.061)	(3.493)
Share of population above age 64	20.688	48.799	2.991	5.967[b]	3.003	4.696[c]	3.180	5.770[b]	3.198	4.906[c]
	(37.114)	(32.244)	(3.773)	(2.592)	(3.761)	(2.694)	(3.794)	(2.768)	(3.750)	(2.759)
Share of German speaking population	−8.555	−6.315	0.206	−0.652	−0.327	−1.087	−0.260	−0.888	−0.599	−1.191
	(16.395)	(14.824)	(1.435)	(1.927)	(1.314)	(1.897)	(1.229)	(1.801)	(1.229)	(1.864)
Postnumerando tax system	0.785	−1.125	0.081	−0.243	0.103	−0.206	0.072	−0.235	0.083	−0.214
	(3.926)	(8.393)	(0.131)	(0.161)	(0.118)	(0.170)	(0.131)	(0.173)	(0.117)	(0.177)
Mandatory fiscal referendum					0.160	0.266			0.169	0.263
					(0.161)	(0.182)			(0.140)	(0.165)

Table 3 (*Continued*)

	I		II		III		IV		V	
	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized
Signature requirement initiative, relative					4.446	−4.022			10.748	0.359
					(17.284)	(16.541)			(17.658)	(17.601)
Fiscal/revenue decentralization (lagged)					1.492	1.046			1.477	1.001
					(0.935)	(0.997)			(0.968)	(0.999)
Cabinet size							0.132[b]	0.129[c]	0.138[c]	0.098
							(0.053)	(0.068)	(0.069)	(0.059)
Parliament size							0.002	−0.003	0.002	−0.002
							(0.007)	(0.005)	(0.007)	(0.004)
Share of left-wingers in parliament							0.627	0.330	0.528	0.454
							(0.627)	(0.808)	(0.665)	(0.876)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	566	550	566	566	566	566	566	566	566	566
Number of clusters	26	25	26	26	26	26	26	26	26	26
Pseudo R-squared/R-squared within	0.302	0.303	0.238	0.281	0.262	0.300	0.267	0.295	0.276	0.305

Notes: (1) Fixed effects logit regressions (column I) and fixed effect OLS regressions (columns II–V); (2) standard errors in parentheses are adjusted for clustering at the level of cantons.

[a]is significant at the 99 % level

[b]is significant at the 95 % level

[c]is significant at the 90 % level

choice of instrument and the coefficients for fiscal rules range from negative to positive. With the share of religious neighbors with fiscal rules as an instrument, the strongest of the three instruments at the first stage, we find results that are broadly similar to the OLS regressions. The effect of fiscal rules on projected deficits is statistically significantly negative, the effect on realized deficits is negative but statistically insignificant and slightly larger (in absolute terms) than the effect on projected deficits. Not surprisingly, the results with lagged fiscal rules are very similar to our OLS estimates.

Given the concerns outlined above, the problems at the first stage, and the lack of robustness of the second stage results, we prefer to rely on the alternative approach of carefully controlling for fiscal conditions and fiscal preferences. In all regressions, we include a measure of debt and of time-varying fiscal preferences at the cantonal level as revealed in frequent federal ballots. This second measure, thus exploits the unique institutional feature of regular direct democratic decisions on fiscal issues at the federal level to capture fiscal preferences. Further, in the robustness analyses, we include a rich set of additional political and institutional control variables.

Finally, we investigate if the adoption of cantonal fiscal rules is related to the main language of the canton or the cantonal approval rate in the federal ballot on the debt break at the federal level held in 2001. Language is a measure of culture; the approval rate is probably the most direct measure for the relevant political preferences. As can be seen from Table 6 in the Appendix, German speaking cantons are neither more likely to adopt fiscal rules, nor to adopt them earlier. Similarly, there is no apparent relationship between the approval rate to the federal debt break and the adoption date.

In the following, we assess the sensitivity of our results to changes in estimation techniques, specifications and samples.

First, in all our regressions, we use a robust estimator of variance to allow for an unspecified form of correlation between observations from the same canton in order to account for serial correlation. With a small number of clusters, the cluster-robust standard errors can be downward biased, leading to over-rejection of the null hypothesis of no effect. In simulation studies with a setup similar to ours, the extent of the over-rejection with cluster-robust standard errors and 20 clusters (i.e., less than our 26 clusters) is small (5.8 % instead of 5 % in Bertrand et al. 2004) or nonexistent (4.9 % instead of 5 % in Cameron et al. 2008). Nevertheless, we also use the wild-cluster bootstrap-t procedure (using the ado-file provided by Malde 2012; with 100,000 draws), which has been found to do especially well by Cameron et al. (2008), but which in their simulation study with a setup similar to ours and 20 clusters even under-rejects the null (4.1 % versus 5 %). The respective p-values are reported in brackets in Table 2. As can be seen from Table 2, all our results remain statistically significant at least at the 10 % level. Clustering at the level of cantons accounts for within-canton autocorrelated errors. As pointed out by Cameron et al. (2011), a similar issue may arise regarding the within-year cross-state errors, if there is geographic based correlation. Therefore, we use their ado-file for estimating the variance with nonnested multiway clustering and cluster at both the level of cantons and years. The respective p-values are reported in braces in Table 2. With this variance estimator, all our results in Table 2 remain significant at least at the 5 % level.

Second, since our dependent variables are binary, column I of Table 3 presents two models based on fixed-effect logit regressions. As can be seen, the results are quali-

tatively similar to the baseline regressions although the result for projected deficits is marginally insignificant (p-value: 0.124) (bootstrapped cluster-robust standard errors with 100,000 draws). Third, creating a fiscal rule index necessarily involves subjective and, to some extent, arbitrary judgments regarding the stringency of different provisions. For this reason, we replace in column II of Table 3 the fiscal rule index by a dummy variable indicating whether or not a canton has a fiscal rule in a particular year. Again, the results are quantitatively and qualitatively very similar to the baseline regressions.

Fourth, in columns III to V, we add two sets of institutional and political control variables. In column III, we add a dummy variable for mandatory fiscal referenda and variables for signature requirements for initiatives and for revenue decentralization. The latter variable is lagged one period in order to avoid mechanical correlations. In column IV, we add variables for cabinet and parliament size and for the share of left-wingers in the parliament. The latter variable is intended as an additional measure of fiscal preferences of the electorate. In column V, both sets of control variables are included jointly.

The size of the coefficients for fiscal rules decreases slightly in absolute terms if these additional institutional and political controls are included. However, for both dependent variables, the effects are still comfortably below zero. Among the additional institutional and political controls, only cabinet size has a significant effect on the dependent variables. A larger cabinet is associated with a higher probability of projected and realized deficits, although the latter effect is not significant in the most complete model. The positive effect of cabinet size is consistent with the notion that common pool externalities become more important if cabinet size increases (Schaltegger and Feld 2009).

Fifth, the results are robust to the exclusion of individual cantons. In the case of projected deficits, estimates range from -0.333 (p-value: 0.000) if Solothurn in excluded to -0.215 (p-value: 0.009) if Bern is excluded (see Table 7 for the full results). In the case of realized deficits, estimates range from -0.173 (p-value: 0.026) if Solothurn in excluded to -0.092 (p-value: 0.064) if Bern is excluded.

5 Concluding remarks

Our empirical analysis for Swiss cantons over the period 1984–2005 suggests that fiscal rules have an economically and statistically significant negative effect on the probability of a projected budget deficit. The effect on realized deficits is significantly negative, too, but considerably smaller. Do fiscal rules improve the quality of budget projections or rather increase creative accounting? In our empirical analysis, we provide evidence that deficit projections become more accurate with fiscal rules. Together, we take this as evidence that fiscal rules substitute for strategic pessimism of finance ministers in budget negotiations with fellow cabinet members and the legislature. In our context, therefore, fiscal rules not only have the intended consequences on the fiscal outcome targeted by the rules but also the positive side effect of more accurate deficit projections. Fiscal rules help, in this respect, to make the budget process more transparent. Of course, we cannot rule out that some or all of

the improvement in realized outcomes are due to creative accounting measures countervailing this positive effect of fiscal rules on transparency. Nevertheless, our results highlight a hitherto disregarded effect of fiscal rules on transparency and contrast with the common view that fiscal rules make the public budget less transparent. The results have, thus, important implication for the evaluation of fiscal rules and other budgetary institutions such as independent evaluation offices.

Our analysis suggests several avenues for future research. First, it would be important to see if our results carry over to another context. Second, it would be useful to have a firm theoretical understanding and more direct evidence on the strategic use of budget projections by finance ministers on the effect of fiscal rules. Finally, it would be interesting to analyze the relative effect of different modes of fiscal governance, independent evaluation offices, and other fiscal institutions compared to and in combination with fiscal rules on the accuracy of budget projections.

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Appendix

Table 4 Details of the relevant cantonal fiscal rules

AG	Target: Balanced budget. (Art. 116 Constitution; Art. 2: 3 Fiscal law.) Rule: Deficit to be compensated in the following budgets by 20 % p.a. (Art. 27: 1 Fiscal law.) Sanction: Consolidation program in case of violation of rule (Art. 2: 4 Fiscal law.) Escape: (i) Severe recession: budget deficit to be compensated by 10 % p.a. (ii) Extraordinary spending and revenues with qualified majority of parliament. (Art. 27: 2 27. 3; 27. 4(5) Fiscal law.)
AR	Target: Balanced budget. (Art. 96: 1 Constitution; Art. 9: 1 Fiscal law.) Rule: No deficit above 5 % of projected tax revenues. Deficit to be compensated within 7 years. (Art. 9: 2 and 9: 3 Fiscal law.) Sanction: No. Escape: No.
BE	Target: Balanced budget. (Art. 101: 1 Constitution; Art. 3: b, c Fiscal law.) Rule: No deficit in the budget. No medium-term deficits for investments. (Art. 101a,b: 1, 2, 3 Constitution.) Sanction: Realized deficits have to be compensated in 4 years. (Art. 101a: 2 Constitution.) Escape: 3/5 of all members of parliament. (Art. 101a,b: 3, 4, 5 Constitution.)
FR	Target: Balanced budget (Art. 83: 1 Constitution; Art. 5 Fiscal law.) Rule: Net indebtedness to GDP not above 6.5 ‰. Budget deficits have to be compensated within 5 years. (Art. 5 and Art. 40b,d: 1 Fiscal law.) Sanction: Tax increases if budget deficit is above 2 % of total revenues. (Art. 41: 3 Fiscal law.) Escape: Majority of members of parliament. (Art. 40c: 1 Fiscal law.)
GR	Target: Balanced budget. (Art. 93: 2 Constitution.) Rule: Budget deficit has to be compensated by at least 25 % p.a. (Art. 3: 4 Fiscal law.) Sanction: No. Escape: No.
JU	Target: Balanced budget. (Art. 3: 1 Fiscal law.) Rule: Self-financing of 89 % for public investments; of 100 % in case of budget deficit. (Art. 123a: 1, 2 Constitution.) Sanction: Escape: 2/3 majority of parliament. (Art. 123a: 3, 4 Constitution.)
LU	Target: Balanced budget. (Art. 76: 2 Fiscal law.) Rule: Budget deficit not above 4 % of total revenues. Budget deficit has to be compensated within 4 years with 25 % p.a. (Art. 7: 1, 2 Fiscal law.) Sanction: No. Escape: In times of economic downturn, budget deficit has to be compensated within 8 years with 12.5 % each year. (Art. 7 Fiscal law.)

Table 4 (*Continued*)

NE	Target: Balanced budget. (Art. 3: 2 Fiscal law.) Rule: Budget deficit has to be compensated by 20 % p.a. in the following budgets if deficit is above 2 % of total revenue. Self-financing of public investments not below 70 %. (Art. 3 Fiscal law.) Sanction: Tax increase to compensate large projected budget deficit. If budget rule is violated in two consecutive years, the maximum level of budget deficit is reduced to 1 % of total revenue. (Art. 3 Fiscal law.) Escape: 3/5 of all members of parliament for a maximum time span of 2 years. (Art. 57: 3, 4 Constitution.)
SG	Target: Balanced budget. (Art. 82: 1 Constitution.) Rule: Taxes are set in order that the projected budget deficit is not above 3 % of total tax revenue. Budget deficit has to be compensated in the following years. Tax cuts only possible if equity is above 20 % of total tax revenue (Art. 61: 1, 2; Art. 64: 1, 2 Fiscal law.) Sanction: Tax increases if budget rules is violated. (Art. 61: 1 Fiscal law.) Escape:
SO	Target: Balanced budget. Rule: Budget deficit has to be compensated within 4 years. (Art. 23: 2 Fiscal law.) Sanction: Majority of members of parliament have to accept new spending items. (Art. 40: 1 Fiscal law.) Escape: Majority of members of parliament. (Art. 23: 1 Fiscal law.)
SZ	Target: Balanced budget. (Art. 4 Fiscal law.) Rule: Expenditures above 10 Mio. CHF (non-recurring) or 2 Mio. CHF (recurring) have to prove the financing. (Art. 42: 1 Fiscal law.) Sanction: Tax increases if expenditures exceed revenues. (Art. 42: 1, 2 Fiscal law.) Escape: No.
VS	Target: Balanced budget. (Art. 3: 1 Fiscal law.) Rule: Budget deficit has to be compensated within 2 years. (Art. 25:1, 2, 3 Constitution.) Sanction: No. Escape: Majority of members of parliament in case of economic downturn, flood and other extraordinary circumstances. In these cases, budget deficits have to be compensated in 5 years with a possibility of prolongation of 2 years (Art. 4, Art. 5 Fiscal law.)
ZH	Target: Balanced budget. (Art. 123: 1 Constitution.) Rule: Budget deficit has to be compensated within 5 years. Qualified majority of large expenditure programs (Art. 123: 2 Constitution; Art. 4: 3 and Art. 21 Fiscal law.) Sanction: Consolidation program with spending cuts if medium-term plans indicate deficits. (Art. 4: 2 Fiscal law.) Escape: Majority of members of parliament. (Art. 21 Fiscal law.)

Table 5 Instrumental variable estimates

	I		II		III		IV	
	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized
A. Second stage regression								
Fiscal rule index	0.371	0.993	−0.330[b]	−0.441	−0.512	−1.501	−0.292[a]	−0.181[b]
	(0.408)	(0.630)	(0.140)	(0.339)	(0.953)	(1.380)	(0.092)	(0.079)
Debt as share of cantonal income	0.100	0.735	−0.300	−0.084	−0.404	−0.689	−0.279	0.065
	(0.547)	(0.655)	(0.322)	(0.437)	(0.779)	(0.999)	(0.348)	(0.420)
Voter preferences	0.001	−0.004	0.002	−0.001	0.003	0.001	0.002	−0.001
	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.007)	(0.003)	(0.003)
Growth income per capita	0.116	−0.055	0.039	−0.212	0.019	−0.329	0.043	−0.184
	(0.691)	(0.462)	(0.596)	(0.400)	(0.590)	(0.556)	(0.601)	(0.400)
Growth unemployment	0.030	−0.023	0.011	−0.061	0.006	−0.090	0.012	−0.054
	(0.061)	(0.074)	(0.055)	(0.062)	(0.047)	(0.086)	(0.055)	(0.061)
Growth population	−7.856[b]	−10.405[c]	−6.840[b]	−8.326[b]	−6.576[c]	−6.789	−6.895[b]	−8.703[b]
	(3.574)	(6.123)	(2.995)	(3.457)	(3.740)	(5.839)	(2.978)	(3.507)
Share of population below age 20	3.427	3.334	4.429	5.383	4.689	6.898	4.375	5.012
	(4.474)	(5.222)	(3.502)	(3.343)	(4.324)	(4.756)	(3.551)	(3.313)
Share of population above age 64	3.595	6.501	3.390	6.082[b]	3.337	5.772	3.402	6.158[b]
	(5.152)	(5.808)	(3.417)	(2.758)	(3.323)	(6.456)	(3.458)	(2.480)
Share of German speaking population	−1.128	−2.706	0.083	−0.230	0.398	1.600	0.018	−0.679
	(1.843)	(3.459)	(1.337)	(2.017)	(2.034)	(4.156)	(1.268)	(1.774)
Postnumerando tax system	0.031	−0.343[b]	0.095	−0.210	0.112	−0.113	0.092	−0.234
	(0.119)	(0.164)	(0.127)	(0.163)	(0.150)	(0.272)	(0.125)	(0.157)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canton effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5 (*Continued*)

	I		II		III		IV	
	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized	Forecasted	Realized
B. First stage regressions								
Excluded instrument								
Share of (geogr.) neighbors with fiscal rules	−0.651[b]	−0.651[b]						
	(0.260)	(0.260)						
Share of (religious) neighbors with fiscal rules			−1.466[b]	−1.466[b]				
			(0.549)	(0.549)				
Signature requirement initiative, relative					11.578	11.578		
					(16.161)	(16.161)		
Fiscal rule index lagged							0.815[a]	0.815[a]
							(0.047)	(0.047)
Included instruments	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	566	566	566	566	566	566	566	566
Number of clusters	26	26	26	26	26	26	26	26
Centered R-squared	0.016	−0.307	0.253	0.249	0.224	−0.535	0.254	0.286
F-test of excluded instruments	6.27	6.27	7.14	7.14	0.51	0.51	299.68	299.68

Notes: (1) Fixed effects OLS regressions; (2) standard errors in parentheses are adjusted for clustering at the level of cantons.

[a]is significant at the 99 % level

[b]is significant at the 95 % level

[c]is significant at the 90 % level

Table 6 Cantons' adoption date of fiscal rules, main language and approval rate in federal ballot on fiscal rule

Canton	Cantonal rule (adoption date)	Language	Federal rule (approval rate)
AG	2005	G	86.7
AI	–	G	89.2
AR	1996	G	87.8
BE	2002	G	86.0
BL	–	G	87.2
BS	–	G	84.8
FR	1960	F	86.1
GE	–	F	74.8
GL	–	G	86.5
GR	1988	G	86.0
JU	2001	F	75.1
LU	2001	G	88.7
NE	2005	F	80.3
NW	–	G	89.6
OW	–	G	87.6
SG	1929	G	89.3
SH	–	G	80.2
SO	1986	G	86.8
SZ	2004	G	87.0
TG	–	G	88.7
TI	–	I	74.7
UR	–	G	81.5
VD	–	F	82.6
VS	2005	F	78.3
ZG	–	G	88.8
ZH	2001	G	85.3

Notes: (1) The columns report the year in which cantons adopted their fiscal rule, the main language of the canton, and the approval rate of voters in a federal ballot on the federal fiscal rule on December 2, 2001. D; G stands for German, F for French, and I for Italian;
(2) The hypotheses that German and French and Italian speaking cantons were equally likely to adopt fiscal rules cannot be rejected (p-value: 0.410). Spearman's rank correlation between adoption date and language (G = 1, F and I = 0) is statistically insignificant (p-value: 0.770);
(3) Spearman's rank correlation between adoption date and approval rate statistically insignificant (p-value: 0.662).

Table 7 Exclusion of individual cantons

Canton	Forecasted			Canton	Realized		
	Coef.	Robust SE	*p*-value		Coef.	Robust SE	*p*-value
SO	−0.333	0.072	0.000	SO	−0.173	0.073	0.026
NW	−0.301	0.084	0.001	NE	−0.171	0.063	0.012
NE	−0.296	0.084	0.002	JU	−0.169	0.065	0.016
ZH	−0.294	0.084	0.002	AG	−0.162	0.070	0.029
JU	−0.293	0.084	0.002	NW	−0.161	0.067	0.024
OW	−0.290	0.086	0.002	VS	−0.161	0.067	0.025
SZ	−0.287	0.082	0.002	OW	−0.161	0.067	0.025
GL	−0.287	0.084	0.002	SZ	−0.160	0.062	0.016
TG	−0.286	0.085	0.003	GR	−0.160	0.069	0.029
GE	−0.285	0.084	0.002	SH	−0.160	0.065	0.022
SH	−0.284	0.085	0.003	FR	−0.158	0.068	0.030
SG	−0.283	0.085	0.003	VD	−0.157	0.065	0.023
GR	−0.282	0.087	0.003	SG	−0.156	0.065	0.024
VD	−0.282	0.084	0.003	TG	−0.155	0.068	0.032
ZG	−0.281	0.084	0.003	GE	−0.155	0.066	0.028
AG	−0.280	0.089	0.004	ZG	−0.153	0.066	0.028
TI	−0.279	0.085	0.003	ZH	−0.153	0.067	0.032
VS	−0.276	0.088	0.004	AI	−0.152	0.066	0.031
BS	−0.275	0.083	0.003	BL	−0.151	0.063	0.026
FR	−0.272	0.083	0.003	TI	−0.148	0.065	0.033
AI	−0.272	0.084	0.003	AR	−0.147	0.071	0.049
BL	−0.271	0.084	0.004	BS	−0.146	0.065	0.035
UR	−0.265	0.078	0.003	LU	−0.144	0.083	0.094
AR	−0.264	0.088	0.006	GL	−0.141	0.063	0.035
LU	−0.260	0.106	0.022	UR	−0.133	0.061	0.038
BE	−0.215	0.075	0.009	BE	−0.092	0.048	0.064

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